

RTTY

JULY-AUGUST 1980

Journal

VOLUME 28 NO.6

75 CENTS

EXCLUSIVELY AMATEUR RADIOTELETYPE



WORLD'S YOUNGEST RTTYER ???

CONTENTS

EPROM CONTESTER PART ONE
BLOCKBUSTER PART TWO
MICROCOMPUTING
CONTESTS

DAD, CAN I BORROW THE TELEPRINTER TONIGHT?????
seems to be what Jeff, age 6, is saying. Jeff, son of Mike, W8QCD practices on the keyboard frequently and knows every function of an ST6 terminal. Jeff also has a working knowledge of Morse code but is somewhat hindered by the fact that he is just now learning to read....

RTTY JOURNAL

Oee Crumpton
Editor & Publisher
P.O. Box RY
Cardiff by the Sea,
California 92007

THE RTTY JOURNAL IS PUBLISHED
10 TIMES PER YEAR. MAY-JUNE &
JULY-AUGUST ARE COMBINED.

Second Class permit
Encinitas, CA 92024

Business Offices
1155 Arden Drive
Encinitas, CA 92024

BACK ISSUES

A duplicate of any back
issue may be obtained from
R.Wilson, 4011 Clearview
Drive, Cedar Falls, IA
50613.\$1.00 PP. Reprints
of all UART articles \$2.00.

SUBSCRIPTION RATES

USA	\$ 5.00	year
Canada	\$ 6.50	"
Mexico	\$ 6.50	"
Air Mail	\$ 7.50	"
Foreign		
Surface	\$ 8.50	"
Air Mail	\$12.00	"
ALL IN USA FUNDS ONLY		

POSTMASTER SEND FORM 3579 to Post Office Box 179 Cardiff, CA 92007

SUBSCRIPTIONS AND ADS ARE CASH IN ADVANCE-NO BILLING

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"WORLD FRIENDSHIP THROUGH AMATEUR RADIO"



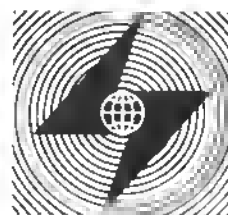
SEANARC '80

SEATTLE NATIONAL AMATEUR RADIO CONVENTION

26th NATIONAL ARRL CONVENTION

July 25 – 27, 1980

Seattle, Washington



**ENJOY THE 26th NATIONAL ARRL CONVENTION
IN THE BEAUTIFUL PACIFIC NORTHWEST**

SEMINARS, DISPLAYS, LADIES PROGRAMS, FORUMS AND MAJOR
EQUIPMENT EXHIBITORS WILL HIGHLIGHT THIS GATHERING AT
THE SEA-TAC AIRPORT RED LION MOTOR INN.

Roy Neal, K6DUE, of NBC News will be the featured Saturday
night banquet speaker.

Vic Clark, W4KFC will explain the results of WARC-79 and what
it means to the future of amateur radio.

Meet ARRL President Harry Dannals.
W2HD, and other ARRL officials.

**For Program and Registration Materials
Write:**

**1980 ARRL NATIONAL CONVENTION COMMITTEE
P. O. BOX 68534, SEATTLE, WASHINGTON 98168**





George Hammon WA6CQW
14215 Pecan Park Lane SP 73
El Cajon, CA 92021

FROM
THE
MAILBAG



TRS-80 M-80

Owners of the versatile TRS-80 with the M-80 interface and M-800 know the joy of operating RTTY with a system offering many advantages and great flexibility. It does however, produce some RFI in the Ham receiver since the TRS-80 keyboard/cables are not properly shielded.

First, you should read the March 1980 issue of QST for an excellent article on RFI and the TRS-80 and M-80. The following modifications should now be completed.

1. Enclose the M-80 in a shielded metal cabinet.
2. Bypass each side of the 12 v ac at the M-80 with 0.1 Mfd capacitors.
3. Use shielded cable from the M-80 to the keyboard.
4. Use shielded cable throughout: PIT, FSK (keep cables short).
5. Replace all radio shack cables with shielded cable.
6. Enclose the keyboard P/S in a metal cabinet and ground the PS.
7. Use line filters (See QST March 1980).
8. Remove all electronic components in the keyboard and spray the inside with tube-coat (Walco, Cesco) and attach a ground strap or mount the keyboard in a metal cabinet.

Many thanks to the west island Amateur Radio Club newsletter and VE2ESV for this information.

VE2ESV has completed up to step 4 and reduced the RFI by 80%. He also reports his biggest improvement was shielded cable to the TV receiver. He would like to hear from you concerning your experiences etc, concerning RFI, M-80 or RTTY operation.

APPLE NET

Amateurs owning the Apple computer should tune into the Apple computer net meeting on Sundays at 0100 on/about 14.329Mhz. Net control is Jim, WB7TRQ in Cheyenne, WY. Info from Alex AF6W.

BUS CHARTERS

I notice in reading about the Dayton Hamfest, many clubs banded together and made the trip by bus. I hope this idea will grow across the coun-

try. Summer is almost here and Amateur Conventions are in full bloom. I would like to start a "grass roots" campaign, getting Clubs to charter a bus when going to conventions, helping the energy crisis in the process. The idea of being let off at the convention door and picked up for the return trip home really appeals to me. I hope that your club will give this some thought. Additionally, parking at most conventions is at a premium. With charter buses or car pooling the Amateur can do his/her part to reduce gasoline consumption.

NCC 1980

The National Computer Conference was held in Anaheim, California on May 19-22. The crowd was placed at about 80,000 with 600 vendors in 1,600 booths. The vast majority of the 100+ technical sessions focused on the usability of computers as tools.

I stopped by the Apple computer booth and was treated to a look at the Apple III, which represents the high end of the company's product line. It is aimed at small to medium sized businesses. The CPU has been tagged the 6502A. The unit will cost from \$4,340 to \$7,800 depending upon configuration. It will be on display around June 1, 1980.

The basic unit has 96K of memory and is expandable to 128K. The built-in disk drive and calculator style numeric pad are features of the Apple III. The built-in disk drive is DDS 3.3 and will increase the disk storage capacity from 116K to 143K. It will support three external disk drives without the need for additional hardware or software.

Apple has a new printer. The apple silentype thermal printer provides draft-quality text and graphic output on paper. Price \$595.00 including the Apple interface card. This compact, versatile unit is portable and only weighs 6 lbs. The printer receives its power from the Apple computer and is compatible with both Apple II and III.

The convention center was filled necessitating booths being housed in

the parking lot and minicomputers being displayed in the underground parking lot of Disneyland's hotel. A shuttle bus was provided at no charge. A touch of class by the Apple Company was Apple night at Disneyland. Free tickets with unlimited rides were given away by stopping at their booth.

RADCOM PLUS

NEW PRODUCT REVIEW

The last several months I have been in contact with Alex Massiao, AF6M about his new RTTY & CW system for the Apple computer. The system was developed by Alex and Dr. Chris Galfo, NB4JMD. This system installs in slot 2 of your Apple II or Apple II plus with interger basic. The card has gold plated contacts with a computer grade circuit board, plug in chips and dip relay with RS-232 FSK output.

The TU has active filters for narrow shift (170 Hz). The card in addition to a TU has LED tuning for RTTY CW and RTTY scope monitoring points. It comes assembled and tested and includes RTTY and Morse code interfaces. Software features Baudot speeds continuous from 32 to 300 baud, ASCII speeds continuous to 1200 baud and Morse code speeds 2 to 125 WPM. The picture gang can store pictures on the disk and transmit them without the access and storage problems of paper tape. On long pictures the unit will CW ID without returning to receive as the picture runs. A repeat of your entire last transmission is also provided. The auto transmit, receives escape key control (PTT) allows the operator to answer a 8K question even with the buffer loaded with your next transmission.

The contest buff will really like the provision to log all contacts to the disk. This means your signal report, message # etc. received and transmitted, all will be logged to the disk and free you to work more contacts faster and do away with all of that logbook work.

The average operator or newcomer will find, on screen CW and RTTY tuning indicators, live keyboard to prepare text while receiving, auto

RTTY-DX

SKIP PRINSEN WB6CYA

3611 Merrimac, San Diego, Calif. 92117

714-276-3182



Greetings to all!

The bands sure have been having their ups and downs of late. When the bands have been good many DX stations have been reported active.

Several countries have not been added to the ARRL countries list as of now. T4 was officially assigned to Cuba so there is some question on that one. H5 is under consideration at the present time so anyone receiving info on these countries or any other country being accepted by the committee please let me as soon as possible.

Sis, SNOsid was at Dayton again this year. He returned carrying much gear, including a complete TR7 station and complete 2 meter repeater system to set up in Lagos, Nigeria. Bud, W2LFL was his host while he was in the US.

Other RTTYers at Dayton: SNOODG, 9Y4VU, K1LL and AH60.

I have received only one input from the comments on the use of ASCII. Jim McAdams of Huntsville, Alabama writes that he would like to see ASCII good above 14,100 and correspondingly on other highbands, and above 3640 on 80 meters. I know that I have tried to tune in 5 level, or what I thought to be 5 level only to find that I could not make head nor tails from the transmission. I ttt, would hope that stations using ASCII would get together say at 14,100 and go up the band.

Here is a partial listing of active stations and the QSL info for some of them: SH3KS, Karl POB 250, DAR-ES-Sallam, Tanzania; ZP5CCG, Pedro; ZP5CPE, Gil; K6SAO/KH2, Xen; SNOsid, Sid; SNOaas; SNOODG; FR7AT, FR7BE, Gene QSL via W4LZZ EA9FJ; EA9GE; EA9HR; S8AAR; S8AAM; VKOKH, Antarctica, GW3EHN; GN4HPD; GN4BIT; G14AHO G14JER; G14ZKT; DK5BD/ST2 QSL OF1BP Walter Hahn, Bransted STR2, D2BDB, Syke, F.R.G.; ZS2M1 QSL via WA2LZK; GJ3FKW; JA10NU QSL via IOLVA; ST5JD, Hese on 50 baud; P29BB QSL via VK4AHO; TRBJG POB 665, Port Gentil, Garbon; Y38XD; PZ1BF; HL9UN QSL via KA6B formerly WB-6T2Q; ON5CK; ON4CJ; DN7AZ; ON7QT; ON7EP; LA5JS; LA3WH; 3D2BN, Bernie soon to QSY

to Trinidad 9Y4; LZ1PG; LX1NG; LX1NH; TF3UA; TF31RA; UK2BAB; UA3AHN; FP80G; ND4-A1 (ex KP4); NA4ZB/KP4; CE3CBG; CE3CEW; CP3EE; CT1EN; Y021S; Y03KPA; OA4BR, Zip Zellon, Box 53B, Lima, Peru; 9G1JX; DX3FG; EA5QW; EA3UU; EA700; EA4ER; EA5ID; EA5ASA; EA3AVG; EA8GF; EAB1Y; TR8PC, Claude; HP1-XUL; VP2AW, Antigua Dorothy using TRS-80, N80, K800; CGACA, Bahamas usually QRV Saturdays 22-2400Z; HX3SB; YV3BIA; YV3-AAG; YV5GU; TG9GI; T12XG; T12CAH; KA6ZC.

Many thanks to the following for their inputs: W3KV; W2LFL; JA1DS1; K1LPS; WB6ZHN; W2PSU; W6XN1; VK2SG and W0HAH. Again many thanks to those who have given their time and efforts to help make these inputs what they are.

73 de SK1P AWARDS SECTION

Worked all continents all on 20 meters #84 dated 1B-4-80. Special award using ONLY 1 watt goes to "Bud" Smith W2LFL.

Worked all continents all on 20 meters #85 dated 1B-4-80 to VE7BTQ, Jack Wiebe.

OXCC 160 endorsement goes to W2LFL. Bud has now worked 162 countries and confirmed 160 countries.

OXCC 180 endorsement to DN4BX, Arthur Slave, Arthur has worked 191/185 confirmed contacts all on RTTY and is number one on the OXCC Honor Roll and holds the RTTY JOURNAL OXCC Award Number one.

HAM HELPS

Tia James, J61T, POB 1026, Castries, Saint Lucia, writes that he is looking to get started in RTTY. He wants to be able to have hard copy so that he can also copy the new services. Can Anyone help him?? Thanks.....

OXCC HONOR ROLL

DN4BX-191/185; ON4CX-184/181; W3KV-182/178; W3DJZ-172/168; K7BV-177/167; 15WT-161/161; W2LFL-165/160; 1BAA-154/152; W5EUN-156/151; W4CWL-153/146; W8JIN-134/129; F8XT-143/128; K6WZ-136/126; F5JA-132/123; JA8AQ-125/120; W3EKT-125/118; DJ8BT-111/106; K3SWZ-110/105; W7NI-110/101; W2IUC-100/100; JA1DS1-108/95; VK2SG 109/94; W2PSU-105/93; K4VON-93/88; WA6-

WGL-102/85; W86CYA-92/82; W0HAH-88/81; OK5WJ-101/76; W0MT-79/73; WBCAT-66/59; WB2VTD-67/57; OF7FB-65/53; K1LPS-65/51; WA6CQW-50/49; W85Q8V-55/42; WA4LLY-38/11; WA2ZXZ-36/12.

VX/ZL/OCEANIA 1980 RTTY DX CONTEST
DATE: 14-15 June 1980

TIMES: 1. 000Z-0800Z Saturday 14th.
2. 1600Z-2400Z Saturday 14th.

3. 0800Z-1600Z Sunday 15th June.

THREE CLASSES: A. Single operator. B. Multi-operator C. SWL operators. Number exchange: Serial # will consist of RST, Zone # and GNT. Scoring as per CARTG Zone chart, multiplied by the # of continents worked. After this world stations add 100 points for each VK/ZL worked on 14 MHz, 200 points for each VK/ZL worked on 21 MHz, and 300 points for each VX/ZL sta. worked on 28 MHz. A station may be worked only once on each band but may be worked on all three bands.

COUNTRIES: ARRL Countries, except that each VK, ZL, JA, VE, VO, W/K districts count as separate countries.

LOGS: Must show in this order: date, GNT, Call sign of station worked, serial # sent, serial number received, points.

CLOSING DATE: Logs must be received by the contest committee by 1-Sept. 1980. Mail to: W.J. Storer, 55 Prince Charles Rd, Frenchs Forest 2086, NSW, Australia.

SUMMARY SHEET: Must show call sign of station, name of operator/s address of same, bands used (separate log for each band), points claimed for each band, # of VX/ZL stations worked, total points claimed and signatures. Multi-operator station logs must contain signature and call of each operator.

AWARDS: Issued for 1st, 2nd and 3rd on a world-wide basis and also on a country basis. The judges decision regarding placings in this contest will be final-logs become property of the committee. This contest is sponsored by the Australian National Amateur Radio Teleprinter Society, POB B60, Crows Nest, NSW, Australia..

KONTEST KORNER

CARTG	October 80	coming
WAEOC	November 80	coming

SEANARC '80
26th NATIONAL ARRL CONVENTION
JULY 25-27, 1980
SEATTLE, WASHINGTON

THE	SCANDINAVIAN	AMATEUR	RADIO	TELEPRINTER	GROUP	9TH	WORLD	WIDE	CONTEST	1979.
SINGLE OPERATOR TOP FIVE			43.W6IWO	30,975	9.G8CDW	49,140	Use the same rules for scoring but based on stations and messages copied.			
CLASS A			44.1V3PV0	30,400	10.0E-G101669613	24,975	LOGS:			
13FUE	408,120	45.0F7F8	29,820	11.0K2-21478	550	Logs must be received by October 10th 1980. The logs to contain: band, date, time GMT, Callsign, exchanges sent and received, points and multipliers. Use a separate sheet for each band and enclose a summary sheet showing the scoring, classification, call-sign, name and address, and in the case of multiple operator station the names and call-signs of all operators involved. Comments will be very much appreciated. Send your log to: S.A.R.T.G Contest & Award Manager, P.O. Box 717, OK 8600 Silkeborg, Denmark.				
W3EKT	295,800	46.G3GGL	27,550	Many thanks to the following for their check logs:			AWARDS:			
SW6ASO	262,500	47.0W20LE	27,060	0W2CNE, W8GKW, WD6AF/0W2CDF			To the top stations in each class, country, W/K, VE/VO and VK call district.			
1T9ZWS	258,500	48.027XE	26,775	0F2AT, 0Z41J.....						
0J6JC	258,240	49.JE2JWK	24,840							
MULTI OPERATOR TOP FIVE			50.0J1KF	21,235	10th S.A.R.T.G CONTEST					
CLASS B			51.VK5WV	20,550	RULES:					
15MYL	341,040	52.K6WZ	19,530	TEST PERIODS:						
L22KRR	189,240	53.W4Y2	17,710	1.0000-0800GNT SAT.AUG16						
UK4FAD	182,115	54.0L6WZ	14,040	2.1600-2400GNT SAT.AUG16						
G3UUP	176,175	55.VE7DOC	13,200	3.0800-1600GNT SUN.AUG17						
0N3GW	156,375	56.GW3EHN	12,875	8AWOS:						
SHORT WAVE LISTENERS			57.0F62Y	12,600	Use all bands 3,5-7-14-21-28 Mhz.					
CLASS C			58.SW78GE	12,480	CLASSES:					
G8120	209,475	59.W3KV	10,680	A. Single Operator						
0W-7481/8	180,225	60.W3JF	9,900	B. Multi-Operator, single transmitter, NOTE:						
0L-005-169485	142,740	61.EA4XM	9,240	Logs from Multi-operators must contain the names and call-signs of all operators involved.						
16-10977	134,400	62.0L2QB	8,840	C. SWL's						
0L-A36/158337	96,205	63.0M2WD	8,820	EXCHANGE:						
CLASS A SINGLE OPERATORS			64.0J2YE	8,280	RST and QSO nr.					
6. K8WW	223,975	65.0H7UV	7,920	POINTS:						
7. I20LM	210,105	66.0J30E	7,370	QSO with own country five						
8. I7FKO	205,755	67. JR2TZL	7,125	(5) point. Other country						
9. I2WEG	193,800	68. LA8SA	6,825	in same continent ten(10)						
10. I2DW1	188,700	69. VE2GV	6,545	points. Other continent						
11. G3ZWW	182,500	70. 0W2F00	5,940	fifteen (15) points. In						
12. W7OPW	145,530	71. SW5AAY	5,250	USA, Canada and Australia						
13. W4CQ1	139,995	72. 0W3QK/0W3RKK	4,680	each call-district will						
14. I2ZGP	101,075	73. JA1EUL	4,060	be considered a separate						
15. 3A2GX	93,515	74. 0J1XT	3,900	country. The same station						
16. JA3AHQ	93,380	75. K8UFW	3,315	may be worked once on						
17. WA20QO	90,475	76. SW6CAL	3,080	each band for gso and						
18. 0Z9JB	86,125	77. SW788J	1,520	multiplier credits. Only						
19. VE48F	86,060	78. TF3UA	1,500	2-way RTTY QSO's will						
20. EA3A2X	81,715	79. VK2EL	1,485	count.						
21. 0N7AZ	76,000	80. F6BY8	1,050	MULTIPLIERS:						
22. 0E70TA	73,990	81. 0Z3UL	780	Use the DXCC list and						
23. ZS6AKO	72,820	82. PJ3SF	770	each district in W/K, VE/						
24. VE2AXO	72,090	83. SW4CJY	760	VO and VK. NOTE: Contact						
25. 0Z8GA	72,020	84. 0W28YF	690	with a station which						
26. SW6AEN	70,225	85. W8TCO	960	would count as a multi-						
27. VE2QO	59,500	CLASS 8 MULTI OPERATOR		plier must be found in						
28. 0Z2X	55,380	6. 0H22Y	151,620	at least 5 logs, or con-						
29. Y021S	52,735	7. SK6AW	115,940	test log from the multi-						
30. LA7AJ	50,150	8. TF31RA	90,990	plier station must be re-						
31. G3ROG	49,750	9. K52CH	79,195	ceived in order to be va-						
32. I1TXO	47,840	10. KF4W/K84HF	72,240	lid.						
33. WA6CQW	46,690	11. 0N388	54,855	SCORING:						
34. VK2PG	42,480	12. LZ1KOP	48,475	Sum of QSO points X sum						
35. H89AVK	40,890	13. 0W5Y1/P	26,790	of multipliers.						
36. ISOESS	40,425	14. 0Z8JYL	22,240	SWL's:						
37. 0W6AK	39,950	15. HA6KVO	20,410							
38. JA10S1	39,400	16. 0W3CF	7,350							
39. W3FV	37,440	S.W.L.'s								
40. VK2EG	33,950	6. 0W-2814/N	90,240							
41. JA10I	32,470	7. 0L-22438	86,310							
42. 7P88C	31,800	8. 0K1-20677	65,520							

RY, Fox and CQ messages, auto carriage return and line feed are also included. The software features of this unit are endless. The few I mentioned in this report are to expose you to how meticulous Alex and Dr. Chris have put together value-packed unit. The cost of this unit assembled and tested is \$190.00, shipped prepaid in the USA, all others add \$10.00.

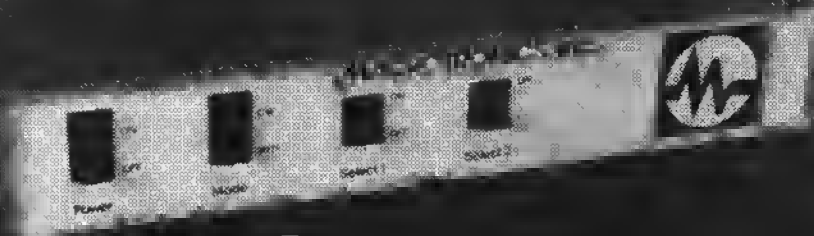
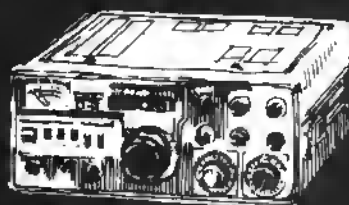
Apple owners getting started in RTTY might consider this unit. I call it instant RTTY. The unit comes with an 8 page instruction manual which documents all of the versatile features of this unit.

I was unable to get information on terminal units and how to get everything hooked up into this column due to a tight printing schedule. Next month I shall devote a large part of my column to this subject. The newcomer can gain valuable information by ordering the "RTTY BEGINNERS HAND BOOK" from the JOURNAL, POB RY, Cardiff CA 92007 cost \$4.50.

So long for now,

George WA6CQW

TRS-80, PET, APPLE, SORCERER Ham Interface Systems



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PET

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- ☐ M65 Send/Receive RTTY & CW (cabinet not included) \$129

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- ☐ A650 Advanced RTTY (split screen) in cabinet as illustrated \$210
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FOR SALE:33 ASR (\$350);3 speed 28RD (\$225);Model 19 (\$150);28 KSR with sprocket feed complete but needs work (\$100);model 14 typing reperf with keyboard (50);very nice OT600 with AFSK in cabinet (150) All above plus shipping. Bill Davis,MOMZN,507-452-3468 after 7PM,RR3,Box 241,Minona,MM 55987.

GOING COMPUTER:FOR SALE HAL-ST-6 \$250 Dovetron T8A-1000 Baudot-ASCII interface \$200.XITEX-MRS-100-Morse transceiver \$125.HAL RVO 1005 Vidio converter \$200.4-N28 stand alone TO's \$100 emch.N28 stand alone 60-75-100 WPM reperf \$125."Ooc",WSFJU,Houston, TX. 713-774-6625.

HAL ST-6 TERMINAL UNIT 850 and 170 shift \$200 plus shipping.Model 28 Miniatur TO (LXO) includes 60 and 100 MPN gears \$100 plus shipping. Bud Herring,PO8 426,Meaverville,CA 96093, Phone (916) 623-4371.

TELETYPE EQUIPMENT AND SUPPLIES.MODEL 28 RO \$125,28 ASR \$350,ROTR (60-75-100)\$150,28 TO (LXO) \$100,New roll paper (12/case) #21 (4 1/2 diameter), \$25 (5 diameter). Ribbons \$10/doz. FOB Rochester.1980 list now available,SA-SE.P.Andersen,115 Boyhen Rd,Rochester MI,48063.313/652-3060.

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RTTY Journal

VHF

RTTY NEWS



Mike Stone, WBØQCD
P.O. Box H, lowden, Iowa 52255

I enjoyed meeting many of you at Dayton this year. The Hamvention was, as usual, well organized and run. Specialized communications were certainly well represented (except for RTTY). Looking forward to next year!

A new repeater located at Ackley, IA (Waterloo area) is now operating under the direction of WBØQDV, Dennis Matura of Applington, Iowa. Frequency is 146.10/70 Mhz. and is RTTY regenerative. Send two spaces and the abbreviation "XMIT" to bring it up. It has no mark tone tail and is difficult to determine whether or not you are in the system. The repeater will stay open for 1 minute after processing the last RTTY signal. Then the two-space "XMIT" sequence must be followed again. This repeater for teletype use makes nearly 70 in the USA! VHF RTTYers in the Des Moines area are anxiously awaiting a new 146.10/70 RTTY repeater in Newton, I. This makes a total of 4 RTTY RPTS in Iowa with WBØDTW/RPT in Ft. Madison area (Jim Garrison) running a combination voice/RTTY RPT. as well as a new "specialized communications" repeater located in the Quad-City area, WOYMW/RPT (Mike Hunt) at 146.03/.63 Mhz featuring RTTY/ASCII/SSTV/Phona and linked with a 439.25 Mhz. ATV repeater sponsored by the Iowa ATV Society. Not bad for cornfield state.

Got a nice newsletter from the Virginia Teletype Society, WB4JBJ/R at 147.705/105 Mhz. They are anxious to get going on VHF ASCII and 34 active stations. The VTS Teletype Net meets every Monday evening at 8 PM on the repeater. 220 Mhz RTTY? You bet says Lee McDaniel, WB4QDJ in the North Carolina News. The 220 repeater in the Winston-Salem area has extended coverage into Greensboro since the North Carolina Radio Amateur Teletype Society put up a new Station Master antenna. There are 25 stations on RTTY at 223.10/224.70 Mhz. WA4GIC/R

CARRS RTTY Group reports in "Line Feed" that with the final approval of ASCII on the VHF bands, they are installing an Intel 80/20 Microcomputer system in the WBØWIC/R 144.71/145.31 Mhz to support ASCII users. ASCII space will be 1070 hz. and 1270 Hz mark so to not interfere with the established Baudot tones. KØVKH, Dick in Rapid City, S.D. verifies my reports of little regular use of ASCII so far on the HF bands. It appears that as warned many years ago, the extra levels of code in the ASCII information exchange along with the higher baud rates, do not provide as reliable copy as the standard Baudot 5-level code. Most who using the ASCII code on 20 meters, are only experimenting and using Baudot as the communications mode. Perhaps others have found better results? Send reports on ASCII activity in the VHF bands and how Baudot/ASCII systems are working out. The ANRAD NEWSLETTER in April reported a very successful ASCII Night QSO Party held on the first day of authorization at 0001 EST March 17th. The following stations successfully carried on, perhaps, the first two-way QSO in the country on ASCII: W4RI, WB4APR, WB4JFI, WB3ETS, WB4NFB, K5ZUV, W3ERG, W4ISM, K4CLP, W4CQI, WD4PAC, K4JUM, WA3MEZ, WB4NAE, W3HCF, W3HCF, W3IJG, WA3LAW and WØLMO. Congratulations!

Special announcement of a planned "specialized communications" meeting for RTTY/ASCII/SSTV/FAX/FSTV buffs at the Sept. Peoria IL Superfest. Forums will be held with live demonstrations of all modes including a KBØFO Fast Scan TV "Fly-By" in his Cessna 150 aircraft! Don Miller, WØNTP will show his latest improvements in Color SSTV and Medium Scan TV. WBØUCW, Ron, will demonstrate the art of the "Rubber-band Model 15 printer!" Plan on making it....

See you,

Mike

ADS CONTINUED

LEO-controlled unit. Features: switchable audio filter; autostart relay; power supply 220 V AC 50 Hz; outputs: loop supply for mechanical RTTY machine, and/or TTL-compatible for VOU. Price, including packing and surface mail postage to anywhere in the world DM 420.00 or \$240. Some more information is airmailed to you for DM 5.00 or \$3.00, this amount is credited on the final price of the unit if ordered later on. Joerg Klingenfuss, Panoramastrasse 81, Hagelloch, D-7400 Tuebingen 7, West Germany.

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SEANARC '80 July 25-27, 1980-Seattle.. BE THERE! WE WILL....

RTTY



microcomputing

In my last column I described a general purpose amateur radio micro-computer application.

This month I would like to discuss how you can get started in home computing. Obtaining a home computer is like buying any expensive home appliance. The best way to learn about them is to read articles, books, and talk with others. Computer Clubs are active throughout the world, attend some meetings and ask questions. Don't forget home computing can be quite expensive. Research the subject well, and don't jump too fast, you may be sorry later.

Let's explore, in a general manner, the types of home computers currently available. They primarily fall into three groups:

1. Single Board Computers with limited expansion capability.
2. Packaged Systems with a bus structure and good expansion capabilities.
3. Home Brew Systems with a bus structure and unlimited expansion capabilities.

A few samples of each type of system are:

1. Single Board Systems—Pet, TRS-80, Apple etc.
2. Packaged Bus Systems—OSI, North Star, SWLP, Midwest Scientific.
3. Home Brew Systems—S100 or SS50 bus cards purchased from one of hundreds of manufacturers.

You may have noted that I stressed the word expansion in all my descriptions. Expansion means that you can add hardware features to your system to do new and different things like play music, memory or even allow the system to speak. You will find that home computers always grow in size. (Murphy's law).

I also threw out another term called a bus. A bus is nothing more than a number of connectors mounted on a printed circuit board with all equivalent pins connected together. Each pin on the connector has a name and a definition for the signal applied to that pin. The most popular home computer busses are IEEE S 100 (100 pins) and the SS50 (50 Pins).

Cards can be plugged into the bus to serve various functions. Let's explore some of the advantages and disadvantages of each system as follows:

1. Single Board Computers—
 - Reasonable initial cost
 - Expansion limited and costly
 - Software easy to obtain on some systems.
 - Not suitable for all ham radio applications.
 - Poor and limited documentation.
 - RF & TVI prevalent on some systems
 - Can be obsolete easily with technology advances.
2. Packaged Bus Systems (assembled or kits).
 - Higher initial cost.
 - Expandable due to bus structure of system.

Software available from manufacturer and other sources.
 Suitable for all ham applications.
 Good documentation.
 Easy to modify and expand.
 Can be upgraded as technology advances.

3. Home Brew Bus Systems

Lowest initial cost.
 Can be expanded at low costs.
 Wide distribution of software in clubs.
 Best way to go for ham applications
 Never obsolete can expand as technology advances.
 Sometimes difficult to get operational.

Once you have selected a possible system, The availability of software should be investigated since this topic requires considerable discussion. This topic in my next column.

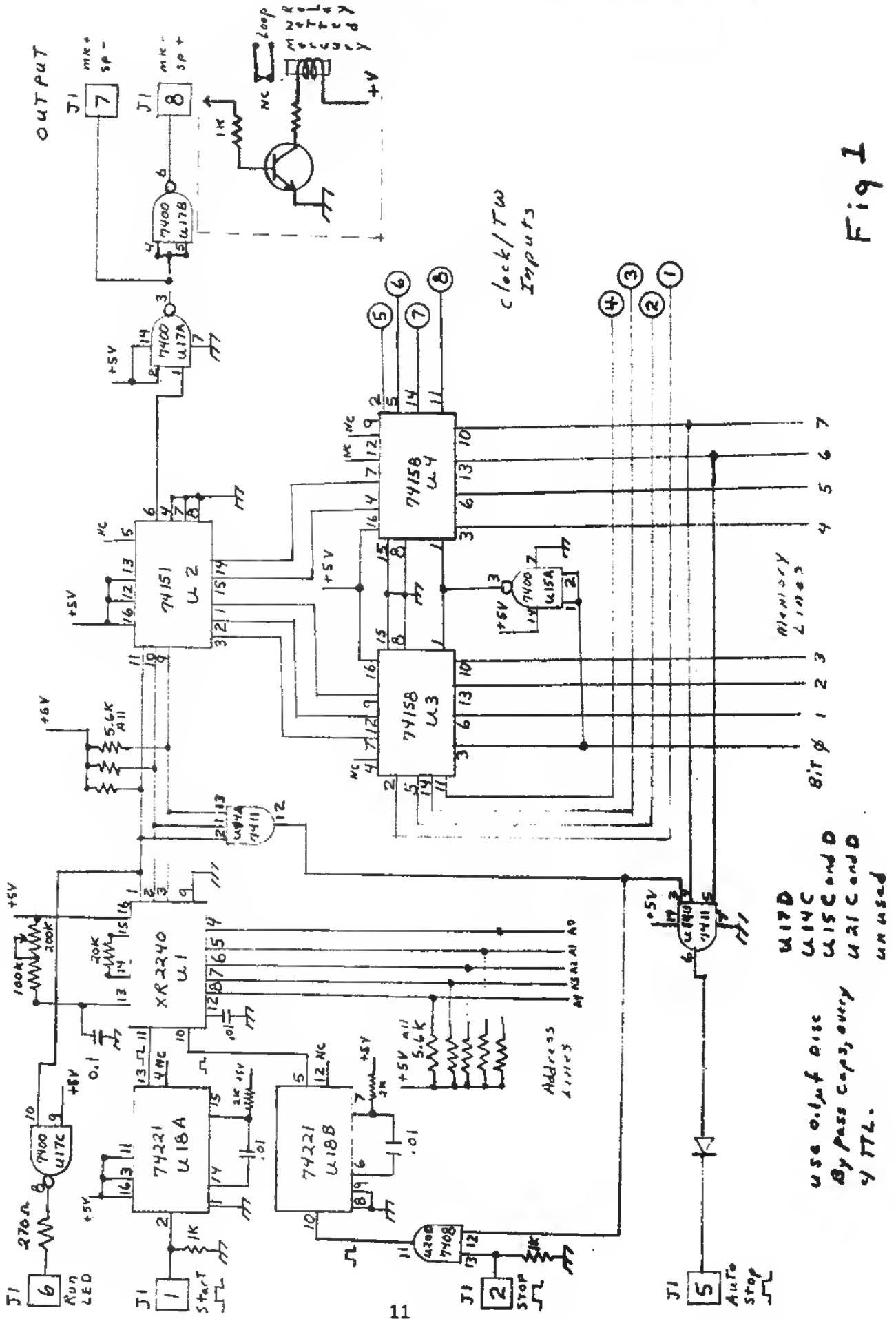
AOS CONTINUED

VACATION IN THE BEAUTIFUL PACIFIC Northwest and enjoy the 26th National ARRL Convention, SEANARC'80 in Seattle Washington, July 25-27, 1980. The theme "World Friendship Through Amateur Radio" headlines a featured program of seminars, tours, ladies programs, displays, forums and major equipment exhibits. Roy Neal, K6OUE is the featured banquet speaker. Not enough room to list everything so get program and registration details from—1980 ARRL NATIONAL CONVENTION, P.O. Box 6834, Seattle, Washington 98168.

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"THE EPROM CONTESTER" BY PAUL JOHNSON KØPJ



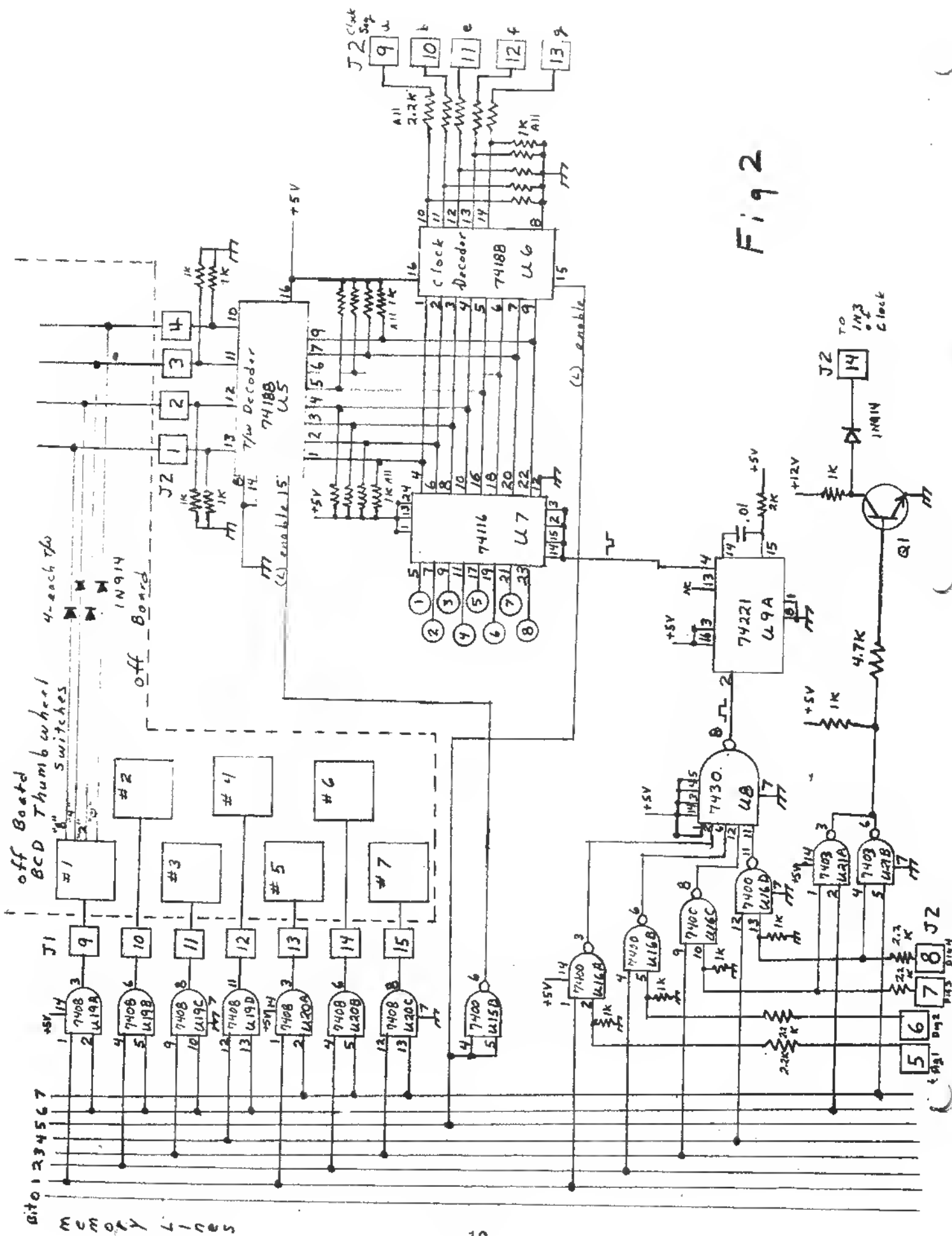
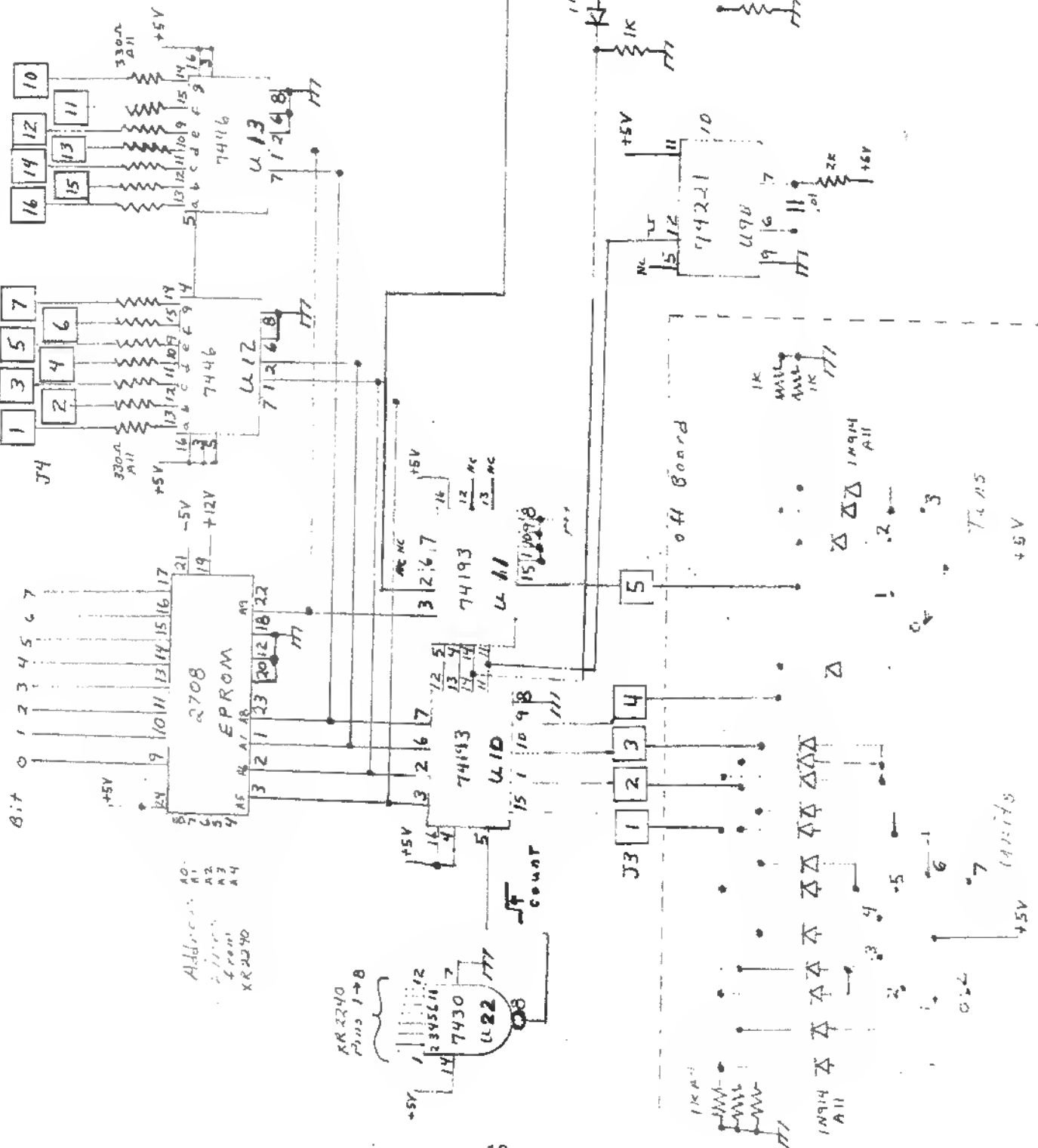
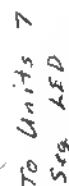
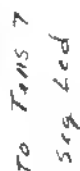
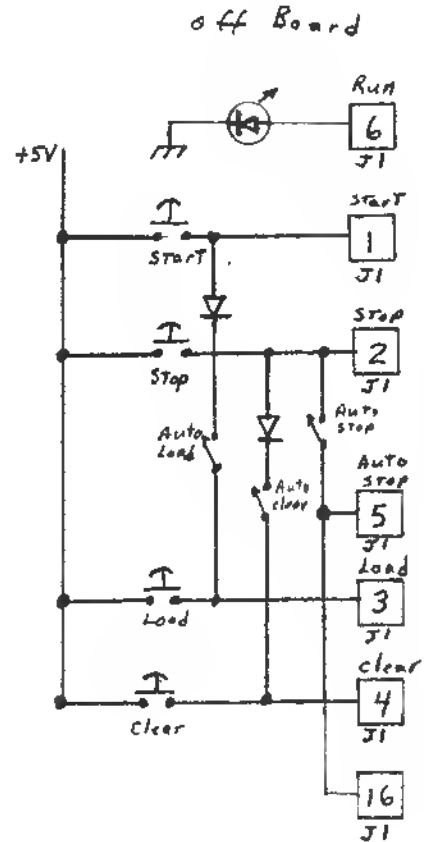
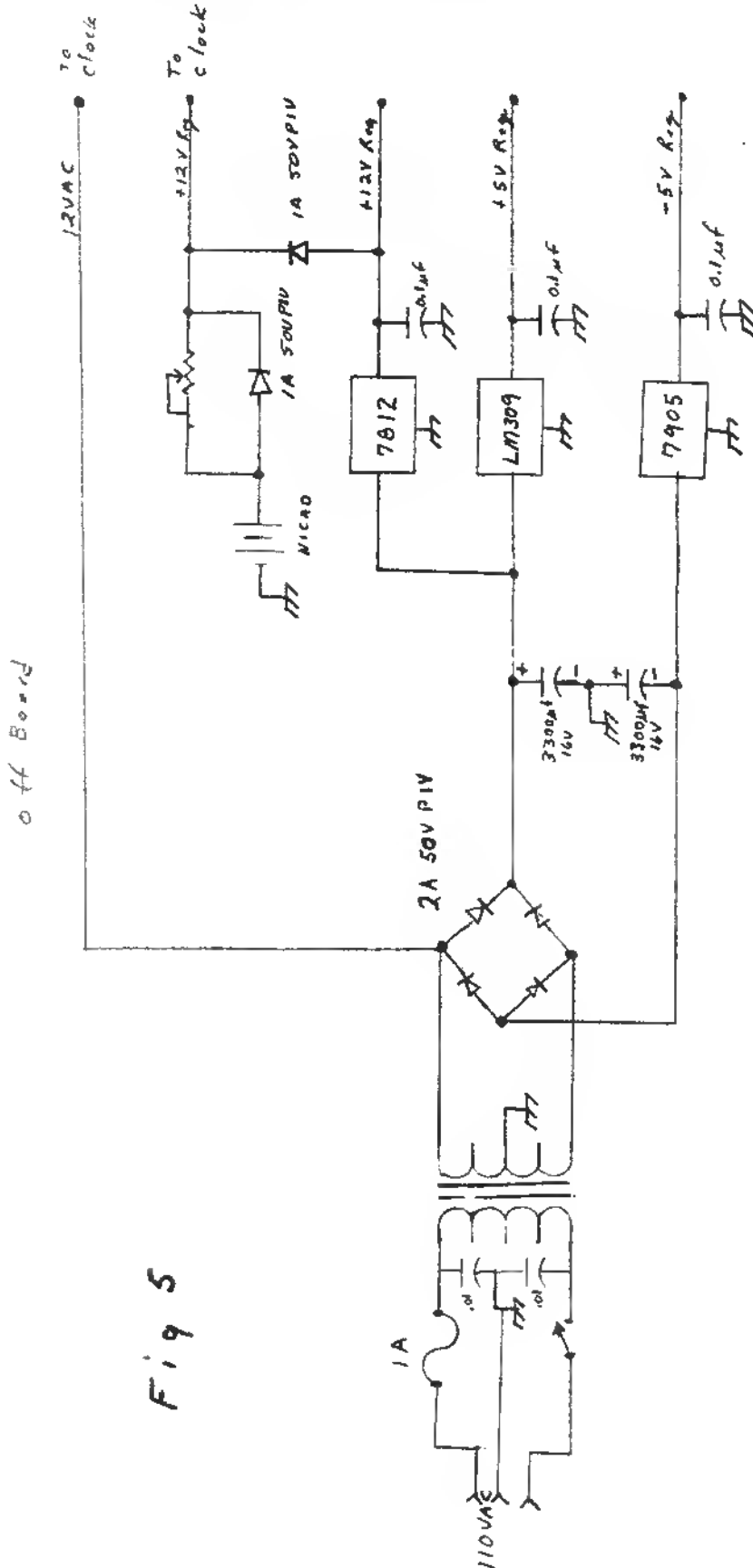


Fig 2

Readout will
be in Octal
max 37_8 or 32_{10}



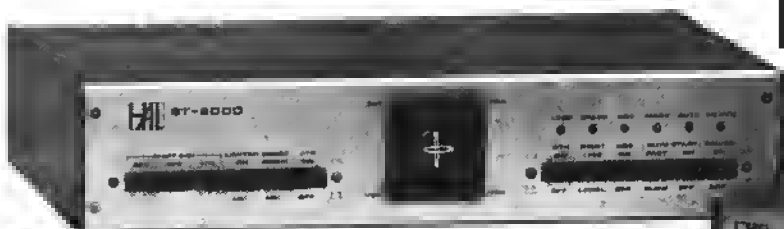
I hope that the five diagrams on these last pages have given you an inkling into the really fine article coming in the next issue of the RTTY JOURNAL. Please do not lose these diagrams as they will not be repeated. Your editor Dee



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The output of the slicer stage of a demodulator such as the popular ST-6 is +12 volts in the mark state and -12 volts in the space state. This is just the opposite of the RS-232C standard for interfacing. The slicer output is connected to a conditioning circuit consisting of two transistors in order to convert it to TTL levels for the serial input of the UART, Pin 2D.

Fig. 3 shows a timing diagram of a character traveling through the UART. Note that the output of the slicer, + and - 12 volts, is converted to +5 and 0 volts at pin 2D. Pins 12, 11, 10, 9, and 8 are the 1st, 2nd, 3rd, 4th and 5th bits of the Baudot code, respectively. These output pins do not change state until clocked by a data strobe generated within the UART. This data strobe signal is available at pin 19 of the UART. It is used by both the IF-2 circuit and by the transmitter section of the UART. It is the task of the transmitter section of the UART to convert the parallel data at pins 26, 27, 28, 29 and 30 back to serial data at pin 25:

The TTL output level at pin 25 of the UART is not capable of directly driving the demodulator's keying transistor. Therefore, an additional conditioning circuit consisting of two switching transistors connected as inverters is used to drive the

keying transistor. IC2 is the clock for the UART and its output is available at the test point (marked T.P. on the PC board). It should be set at sixteen times the baud rate. For 60 NPN operation, this means a frequency of 727 HZ (16 X 45.45).

DECODING

The main purpose of the IF-1 circuit is to convert the serial data to parallel data so that all five bits of data are available simultaneously. Our next task is to decode these five bits of data so that each of the 32 possible Baudot characters has its own output port. To accomplish this end, two 4-line to 16-line decoders are used. Each of these is capable of decoding a 4-bit binary number and addressing one of 16 outputs. Since the Baudot code is a five bit code with 32 combinations, we use two of these chips to obtain the necessary output ports. Only one of these chips is on at a time. In addition, only one of the 32 outputs

is low at any given time. Table 1 shows the truth table for this Baudot decoding circuit. Pins 18 and 19 of the 74154 are gates that must be low to enable the chip. Note in Fig. 2 that an inverting transistor circuit has been added to ensure that pins 18 and 19 of IC1 are always the complement of pins 18 and 19 of IC2. While IC1 is enabled, IC2 is disabled and vice versa. Only one of the 32 outputs of IC1 and IC2 are low; all remaining pins are high. The net effect of this circuit is to decode one of 32 outputs with 5 address lines. These 32 outputs are now available for programming any 4-character sequence for the Selcal and any 7-character sequence for the WRU.

SEQUENCE DETECTION

Now that the Baudot code has been decoded and there is a unique output port for each character, we must detect the sequence of these characters. In addition, if an incorrect

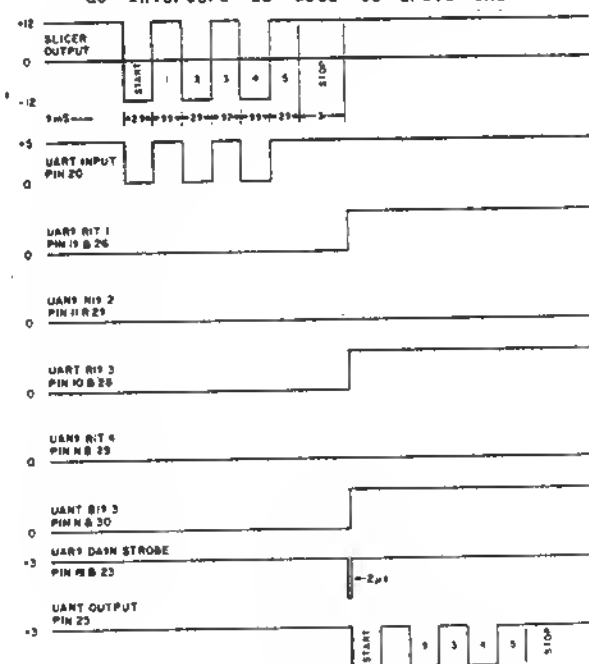


Fig. 3. UART timing chart.

Binary Address Bit Number	5	5	4	3	2	1	Low Pin of IC1	Low Pin of IC2	Character
IC1 Pin Number	18,19	2D	21	22	23	23	IC1	IC2	
	H	L	L	L	L	L	1		BLK
	H	L	L	L	L	H	2		E
	H	L	L	L	H	L	3		LF
	H	L	L	L	H	H	4		A
	H	L	L	H	L	L	5		SP
	H	L	L	H	L	H	6		S
	H	L	L	H	H	L	7		I
IC1 ON	H	L	L	H	H	H	8		U
IC2 OFF	H	L	H	L	L	L	9		CR
	H	L	H	L	L	H	10		D
	H	L	H	L	H	L	11		R
	H	L	H	L	H	H	13		J
	H	L	H	H	L	L	14		N
	H	L	H	H	L	H	15		F
	H	L	H	H	H	L	16		C
	H	L	H	H	H	H	17		K
	L	H	L	L	L	L	1		T
	L	H	L	L	L	H	2		Z
	L	H	L	L	H	L	3		L
	L	H	L	L	H	H	4		W
	L	H	L	H	L	L	5		H
	L	H	L	H	L	H	6		Y
	L	H	L	H	H	L	7		P
IC1 OFF	L	H	L	H	H	H	8		Q
IC2 ON	L	H	H	L	L	L	9		Q
	L	H	H	L	L	H	10		B
	L	H	H	L	H	L	11		G
	L	H	H	L	H	H	13		Fig
	L	H	H	H	L	L	14		M
	L	H	H	H	L	H	15		X
	L	H	H	H	H	L	16		V
	L	H	H	H	H	H	17		LTR

Table 1. Baudot decoding chart.

character or sequence is detected, the entire sequence must be started again. This task is accomplished by IC6 and IC5. IC6 is a 74174 hex D-type flip-flop. This chip contains 6 flip-flops that will pass along the data on the input (D) to the output (Q) only on the positive going edge of the clock pulse. The clock pulse is supplied by the data strobe output of the UART.

Let's go through an example to illustrate the sequence detection process. The sequence circuit starts with all inputs and outputs high. Pin 3 of IC6 goes low on the first character. The UART data strobe then clocks the flip-flops and this low state is transferred to the output, pin 2. This output is then ORed with the second character. Let us assume the second character is not part of the correct access code. Therefore, pin 12 of IC5 will be high, pin 11 will be high, and hence the output of the second flip-flop, pin 5, will remain high. More importantly, the entire sequence must be started over again since there is now a high state on pin 3 of IC6 and hence on its output. Now let us assume the second character coincides with the correct access code; pins 11, 12, and 13 of IC5 will all be low. This low is then passed on to the next OR gate. This process remains the same for the 3rd and 4th characters. If the correct sequence is used a low state finally appears at the 4th flip-flop, pin 10 of IC6. This low state is used to force the teleprinter motor on. If at any point an incorrect character is used, all outputs go high.

The NRU access code simply requires 3 additional characters to trip the NRU circuits. The detection of these characters occurs in a similar manner; however, an additional chip (IC7) is required.

NNNN SHUTDOWN DETECTION

Now that we have turned on the teleprinter by using the correct access code, we must provide a means of turning it off. The customary code sequence to turn off the teleprinter is NNNN.

The heart of the NNNN shutdown circuit is a binary counter, IC3, a 7493. This chip simply counts the number of Ns. Pins 2 and 3 are enable pins

that must be low for the chip to count. Since these pins are connected to the N output port of IC1, the chip is allowed to count only when an N is decoded. The input, Pin 14, is connected to the UART data strobe. As seen from the timing chart, Fig. 3, a 2-microsecond pulse is generated by the UART for each and every character. However, the 7493 only counts Ns because it is disabled for all other characters.

IC4, a 7474, is a bistable latch that controls the teleprinter through relay K1. When the proper sequence has been detected by the Selcal sequence circuit, the output of IC4 is set, and when the NNNN shutdown code has been detected by IC3, the latch is, in essence, reset. Pins 10 and 13 of IC4 are used to externally force the motor on or off via the momentary switches.

SELCAL INTERFACING

The Selcal may be integrated into the RTTY station in several ways. Fig. 2 shows two Selcal interfacing schemes. Case 1 shows the teleprinter motor controlled directly by the Selcal. This is the easiest method, and for those without a demodulator with autostart, the only method.

IF-2 SELCAL CONTINUED

Case 2 is a superior interfacing technique for several reasons. By controlling the ST-6 demodulator motor relay, we have, in essence, ANDed the autostart circuit in the demodulator with the Selcal circuit. This means not only must an authentic RTTY signal be present to trip the autostart circuit, but also the correct character sequence must be received. This means less of a chance of accidental turnons. More importantly, if the other station forgets to send 4 Ns, the teleprinter will turn off when the RTTY signal ceases. Of course, you are now running simple autostart since the teleprinter will turn on now with any RTTY signal, but with the next station sending 4 Ns we will reset the circuit. Another advantage of Case 2 is the fact that the motor relay of the ST-6 also controls the selector magnet loop current. Therefore, not only is the teleprinter's motor off, but also the 60 mA local loop current.

NRU INTERFACING AND TIME CONSTANT

CALCULATIONS

Integrating an answerback system into an RTTY station is more complicated than interfacing the Selcal. The variety of ways is also greater. Fig. 2 shows 3 possible methods.

Let's start with Case 3 first. In this interfacing scheme, it is assumed the station has a message-generating unit and a CW ID unit. Now let us assume that the NRU message lasts 20 seconds, and the CW ID requires 10 seconds. This means the transmitter must be on for a total of 30 seconds to allow both the NRU message and CW ID to be broadcast. The "on" time of the transmitter is determined by the RC time constant of IC8. The time constant is given by approximately $R \times C$. Since R is fixed at 1 meg for all timers (IC8, IC9, and IC10), the necessary capacitance for a 30 second time delay is 30 μ F. Therefore, this means that when the NRU access code is received, relay K2 will be energized for an interval of 30 seconds. K2 is a two-pole relay that simultaneously controls the transmitter and message-generating unit in this case. Since K2 is actuated for 30 seconds, the transmitter will be on for this 30-second period. Relay K2 also enables the message generator for 30 seconds. Since the message is 20 seconds long, the message generator used in this case must be able to inhibit itself after the 20-second message is complete. After 20 seconds have elapsed, the message is finished and we will want to start the CW ID. The time before the CW ID starts is determined by IC9. Here the capacitance necessary for C2 is approximately 20 μ F, giving 20-second delay. After IC9 has timed out, we want to start the CW ID. If you have an electronic CW ID unit, chances are a momentary closure of K3 will be satisfactory. Therefore, C3 may be 1 μ F to give a 1-second contact closure. If your CW ID unit requires a closure of K3 for the entire 10-second duration of the CW ID transmission, C3 should be 10 μ F.

Using the formula will only get you into the ballpark. The actual capacitance values for C1, C2, and C3 will have to be determined through trial and error.

The case 2 interfacing method assumes that a unit that sends a message followed immediately by a CW ID is used. This is the method I use and it works as follows. Let's assume the message and CW ID transmission require a total of 30 seconds. Let us also assume that we do not want to start the message for 10 seconds. While this may seem strange it is really a very nice feature. For with this method, the person receiving your message has a grace period of 10 seconds to turn switches and tune your signal in properly before the message and CW ID begins. This scheme requires the transmitter to be on for 40 seconds, the 10 second grace period plus the 30 seconds required for the message and CW ID. Therefore, C1 should be 40 uF. Since we want to pause for 10 seconds before starting the message and CW ID, we set C2 at 10uF. Assuming the CW ID unit requires only a momentary contact closure to start the message and CW ID, C3 is set at 1uF for a closure of relay K3 equal to 1 second. This interfacing method is also ideal for those amateurs with only a CW ID unit. For while it is nice to have a RTTY message followed by a CW ID, only the CW ID is legally necessary. Therefore relay K3 may be used to simply start the CW ID.

The last interfacing scheme, Case 1, is for those fortunate RTTY amateurs with a UT-4. The actual time constants remain the same as in Cases 2 and 3, the only difference being in the circuit used to turn on the transmitter. Interfacing the WRU circuit with the UT-4 switch, S3, is shown in Case 1.

POWER SUPPLY

Fig. 4 shows a power supply scheme that will supply all the necessary voltages for this project. However, the entire supply may not be required. For example, if 12 volt relays are not used in your particular interfacing scheme, the +12 volt dc source is not required.

The UART is the only IC that requires the -12 volt dc source and the current drain is quite small. If you have an ST-6, the -12 volt supply of the ST-6 could easily handle this load.

The +5 volt is used by both the IF-1 and IF-2 boards. The IF-1 circuit requires approximately 20 mA while the IF-2 circuit requires approximately 200 mA. Both current requirements can be easily handled by the +5 volt supply shown in Fig. 4.

CONSTRUCTION.

Construction of the project is made simpler by using printed circuit boards. The boards available from this author are professionally fabricated and drilled.

The IF-1 board requires six jumpers. Also note that the 4 transistors on this board will require the leads to be bent to conform to the PC board layout. The IF-2 board requires 8 jumpers plus seven programming jumpers. The dot next to each integrated circuit on the board signifies pin 1 of each chip. The IC number is also on the board to help designate the proper location of each chip. The numbers 1 through 7 located near ICs 5, 6, and 7 represent one end of the program jumper wires. The other end of each of these wires is connected to the desired characters of IC1 and IC2.

If the builder wishes only to fabricate a Selcal without the WRU circuit, many components may be deleted. Fig. 8 indicates by dots those components that are not required for the WRU.

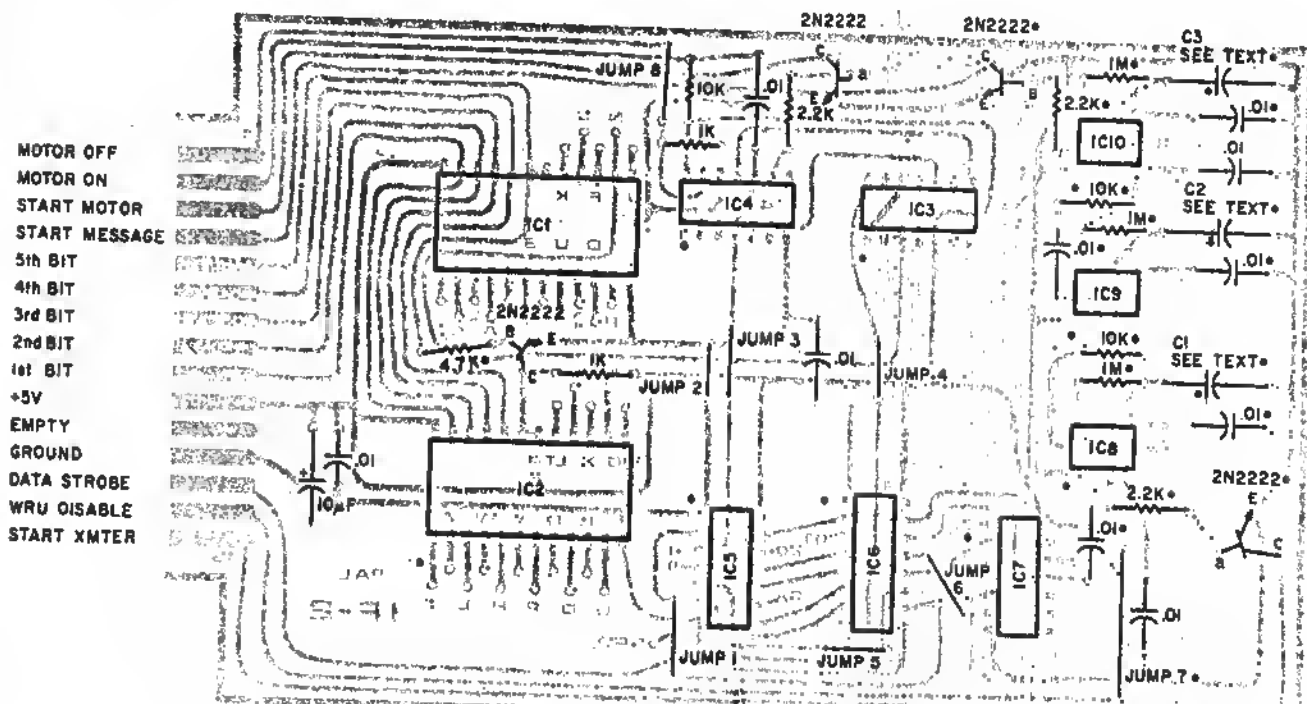


Fig.* IF-2 component placement ICs 7,8,9,10 and those components denoted by dots are not required for SELCAL only.

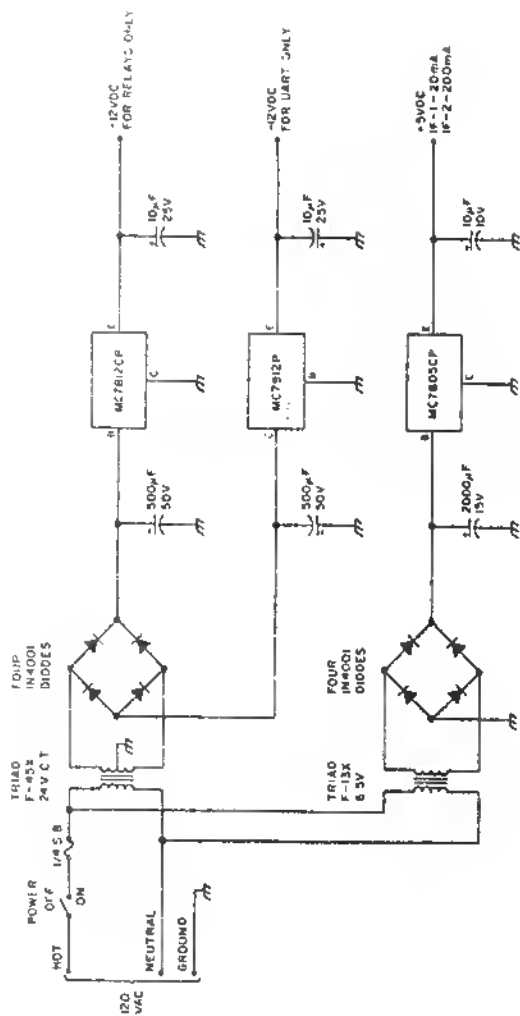


Fig. 4. Power supply.

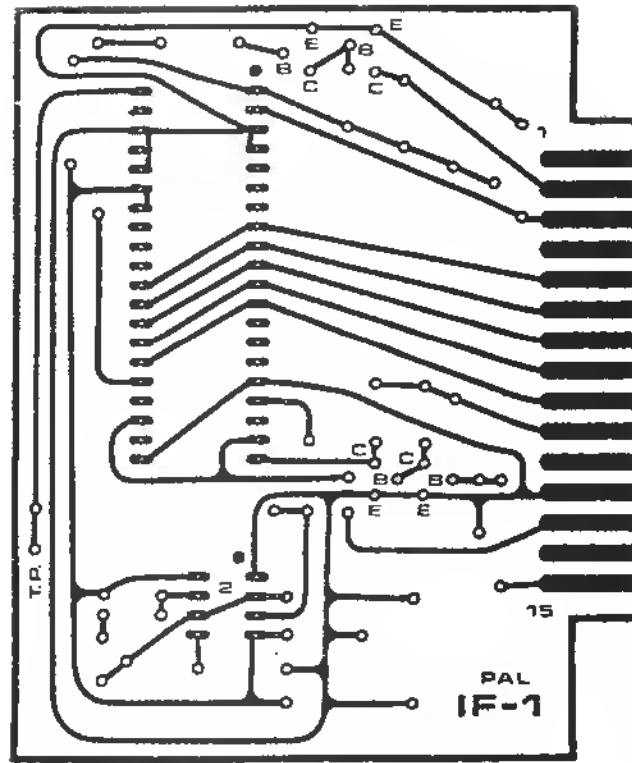


Fig. 5. IF-1 printed circuit board layout (full size).

EMPTY
OUTPUT
~12V
EMPTY
5th BIT
4th BIT
3rd BIT
2nd BIT
1st BIT
+5V
EMPTY
GROUND
DATA STROBE
EMPTY
INPUT

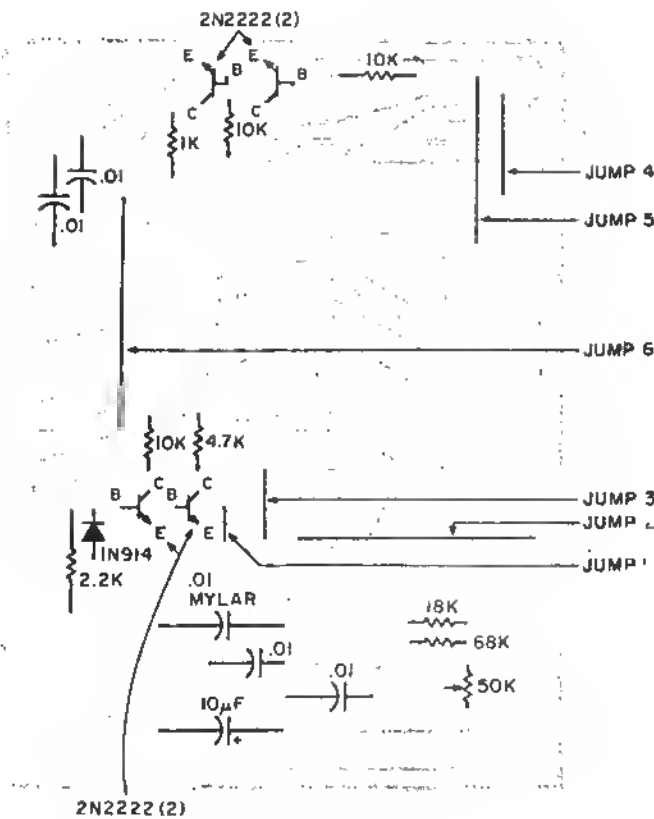


Fig. 6. IF-1 component placement.

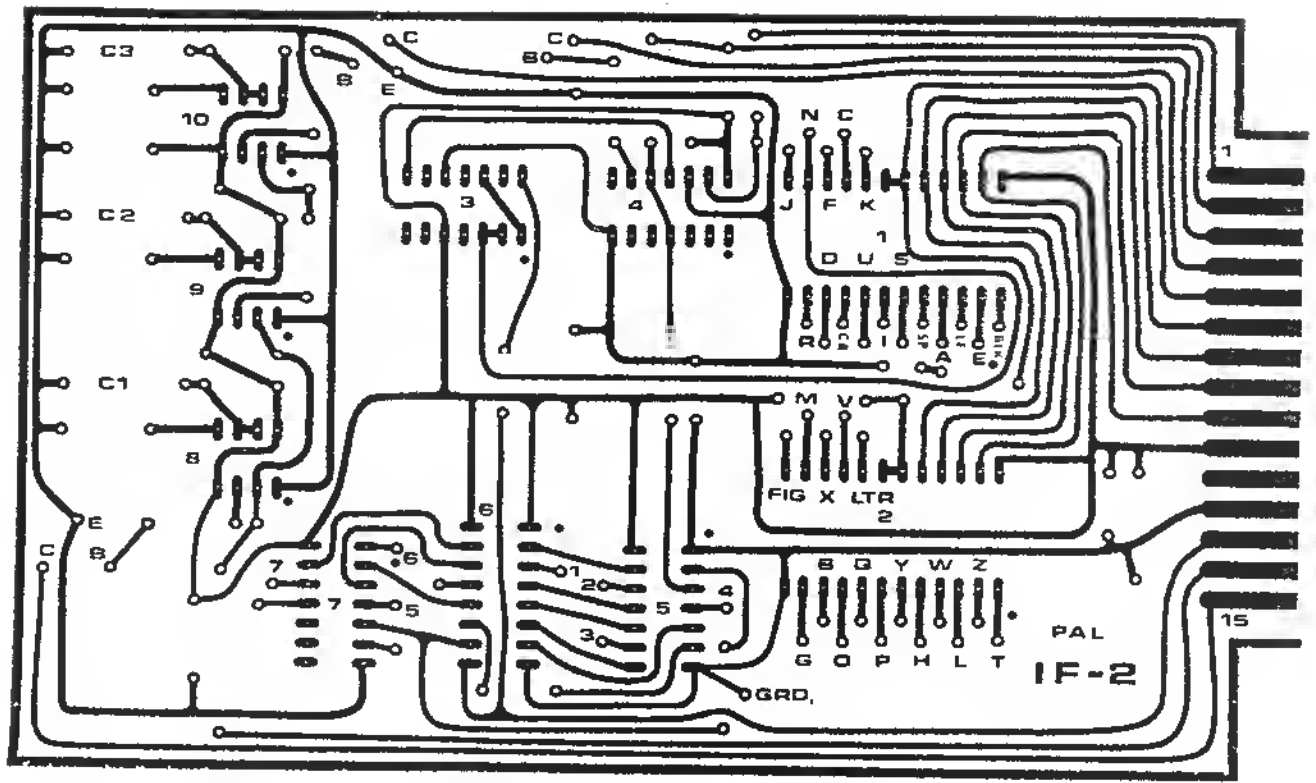


Fig. 7. IF-2 printed circuit board layout

Photo 5. Top view of the UT-4 and IF-2 unit. Note the UART parallel data wires leaving the third board from the front. This is the board shown to the extreme right in Photo 3. These wires are terminated on the IF-2 board fourth from the front.

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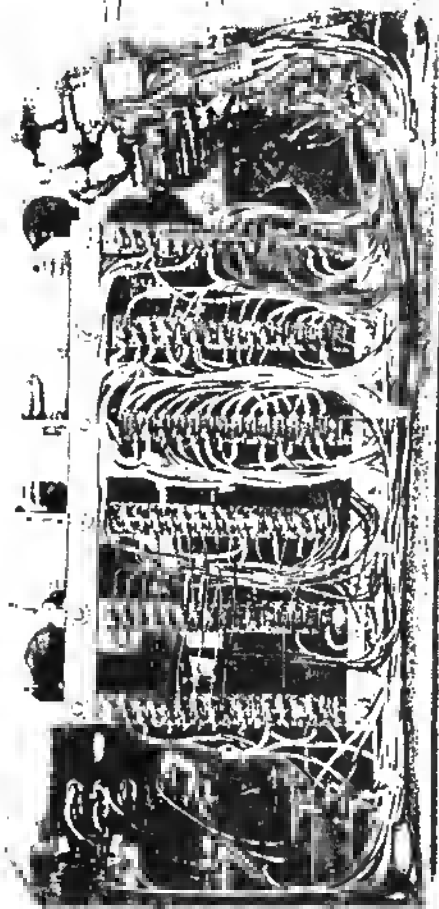


PHOTO 6 Side view of the IF-2 and UT-4 unit. Using this construction method to mount the edge card connectors is especially nice since it allows easy access to the connector pins.

If you have a UT-4 and have used printed circuit boards for the project, you may be wondering how to pick off the necessary data points from the printed circuit board. Photos 4, 5 and 6 show a UT-4 that has been interfaced to an IF-2. Note in particular Photo 5. This photo shows at the extreme right a UT-4 board with the UART on it. In this case, an extension was added which contained a connector. The wires were then run from the connector to the necessary points on the UART.

ACCESS CODE PROGRAMMING

The access code to trip the Selcal can be anywhere from one to four characters in length. While it is customary to use only the last three characters of a station's call, the exact number of characters will be a function of the letters. Certainly a station with the call W6AND would not want to use only the last three characters (AND) since the word AND occurs frequently in English text. In this example, the Letters character would be added as a fourth character before the letter A to prevent premature turn-ons. While any character may be added, the Letters character is a natural since it would normally go after the number 6 and precede the letter A when the call is normally typed. Therefore, in this case, our four character access code would be: Letters, A, N, and D. These four characters are programmed on the IF-2 board by four jumper wires. The first character, Letters, is programmed by connecting a wire from pin 3 of IC6 to pin 17 of IC2. The IF-2 printed circuit board has the number 1 next to pin 3 of IC6, indicating this is the first character to be programmed. Next to pin 17 of IC2 the abbreviation LTR is shown, indicating this to be the termination point if a Letters character is desired. In a similar manner the second character A would be programmed by connecting a wire between pin 12 of IC5 (2nd character) and pin 4 of IC1 (A character). This procedure would be followed for the remaining characters M and D.

Now suppose your call is WA2ILP. The letters I, L, and P are not likely to occur consecutively in a normal conversation. Therefore, three characters should be adequate as an access code for the Selcal. Since there is a need for only three of four pos-

sible characters, the first character, pin 3 of IC6, is grounded. The characters I, L and P then become the second, third and fourth characters of the access code, respectively. The IF-2 printed circuit board has a hole marked GRD for the purpose of grounding the first character (pin 3 of IC6) should a three character access code be desired.

For those with a two letter call, you might find it necessary to use 4 characters for the access code. For example, in my call W9IF, I use the following four-character access code: 9, Letters, I, and F. Referring to the Baudot code, you will see that the number 9 has the identical code as the letter O. Therefore, the first character (pin 3 of IC6) would be connected to the letter O (pin 9 of IC2). The remainder of the call would be programmed as previously discussed.

The access code to trip the answer-back system consists of a total of 7 characters. The first four are the Selcal characters. Three additional characters, typically, Figures, Blank, and H make up the remainder of the access code. These three characters represent the 5th, 6th, and 7th characters of our access code. To program Figures as the 5th character, a wire is connected between pin 4 of IC7 and pin 13 of IC2. The 6th and 7th characters are programmed in a similar manner.

Other WRU access codes are Figures, Blank, and W, and more recently, W, R, and U. The IF-2 printed circuit board gives the user complete flexibility in determining the answer-back access code.

In summary, a typical 4-character access code to turn on the teleprinter might be Letters, A, N, and D. The access code to trip the answer-back system for this station might then be the following seven characters: Letters, A, N, D, Figures, Blank, and H.

CONCLUSION

The Selcal and WRU answer-back system has been in operation for over 2 years now without any problems. When I recently received my two-letter call, reprogramming the access code required only a few minutes. The Selcal has enabled me to keep contact with friends, and the WRU has given them the confidence to send a note knowing it will be received.

For those not familiar with some of the more popular autostart frequencies, they are as follows: on 80 meters, 3637.500 and 3617.500 kHz; and on 20 meters, 14,082.500 and 14,075.000 kHz.

I would like to thank Cal Sondgeroth, W9ZTK for some design ideas, and Spence Clope, W9LOH for fabricating a unit to confirm design validity.

REFERENCES

- Fehlauer, W. "What's a WRU?" RTTY JOURNAL July-Aug 1976 p.4.
Hoff, I. "The Mainline UT-4" RTTY JOURNAL, Feb., Mar., Apr., May 1974.
Lichtenwalner, B. "The Computer QSO Machine", 73, Jan 1976 p 80.
Magee, J. "ZAP!", Kilobaud Feb '77, p 18.
Malanowicz, D., RTTY JOURNAL, Apr. 1976 p 3.
Sanders, L. "RTTY Autocall—the digital way", 73, Feb, 1976 p 76.
Sonderoth, C., "An RTTY Selcal with TTL Logic" 73, Nov. 1972 p 20.

PRINTED CIRCUIT BOARD PARTS LIST.

QUANTITY	DESCRIPTION
1	AY-5-1013 (UART, IC1)
1	LM555 (timer, IC2)
1	1N914 diode
4	2N2222 transistor
1	1k 1/4 W resistor
1	2.2k 1/4 W resistor
1	4.7k 1/4 W resistor
3	10k 1/4 W resistor
1	18k 1/4 W resistor
1	68k 1/4 W resistor
1	50k potentiometer
1	.01 uF mylar capacitor (timing)
4	.01 uF ceramic capacitor
1	10 uF tantalum capacitor

IF-2 Selcal Only

2	74154 (4-line-to-16-line decoder, IC1, IC2)
1	7493 (binary counter, IC3)
1	7474 (4-bit bistable latch, IC4)
1	7432 (quad OR gate, IC5)
1	74174 (hex D-type flip-flops, IC6)
2	2N2222 transistor
2	1k 1/4 W resistor
1	2.2k 1/4 W resistor
1	4.7k 1/4 W resistor
1	10k 1/4 W resistor
5	.01 uF ceramic capacitor
1	10 uF tantalum capacitor

IF-2 with W-R-U

additional components are required for the W-R-U

1	7432 (quad OR gate, IC7)
2	2N2222 transistor
2	2.2k 1/4 W resistor
2	10k 1/4 W resistor
3	1 meg 1/4 W resistor
5	.01 uF ceramic capacitor
3	C1, C2, C3 tantalum capacitor (see text)

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*The MPC-1000R is also available without a TSR assembly and functions as a MPC-1000C with a Triple Tone-Pair AFSK Tone Keyer. This "Basic-R" permits future expansion with a TSR-100, TSR-200, TSR-200D or TSR-500 by simply lifting the lid and plugging in the appropriate TSR assembly: Amateur Net (Basic-R): \$595.00

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